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Building 364 Tier 2 Safety Basis Document Building 364 Animal Care Facility

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BUILDING 364 TIER 2 SAFETY BASIS DOCUMENT

Building 364
Animal Care Facility

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1.0 Screening Report

LLNL Facility Screening Report (SCR) for:

Animal Care Facility, Building 364

Lead Preparer: James L. Vigus	Date Performed: 12/12/05

Facility Description

Building 364 is a 10,951 square foot single story structure of concrete block exterior walls. The main portion of the building has a built-up roof on a steel deck over steel joists and columns with lightweight concrete insulation. The interior walls are gypsum board over wood studs. The 1800 (North) wing is also constructed with concrete block exterior walls and has a built-up roof on ½" plywood roof sheathing over open-web wood bar joist roof trusses. The facility is located approximately 841 meters (2,760 feet) to the nearest fenceline.

Define facility type:	**Owner Organization:**
Check: ☒ Single Structure or Area: (B/Tr/A) B364 ☐ Complex of Buildings: Designation _____ ☐ Segment* of Bldg or Complex: _____ Seg.# _____ *Attach justification for segmentation	Directorate: CMLS Facility AD: Tomas De La Rubia

Final Facility Classification: (Check)

☐ LSI ☒ Low ☐ Moderate ☐ High ☐ Nuclear Facility ☐ Accelerator

Concurrence Signatures for Facility Classified as LSI:**

Lead Preparer :_____ Date: _____

AB Section Leader or designee: _____ Date: _____

ES&H Team Leader or designee: _____ Date: _____

Approval Signature for Facility Classified as LSI:**

Facility Management: _____ Date: _____

Supporting Documentation Appended	**Comments:**
Check as appropriate: ☐ Justification for Segmentation ☐ Chemical Hazard List ☒ Radiological Hazard List ☐ Explosive Hazard List ☒ Building Layout ** Signatures are not required on this form for facilities classified as Low, Moderate or High. Approval signatures for these are on the cover of the Tier 2 or Tier 3 SBDs.	

Identification of Operations, Inventories, and Hazards

List key operations that are conducted within the facility:

Animal care and research facility, which includes operation of a Cs-137 irradiator capable of irradiating small objects with gamma radiation within a shielded interlocked enclosure. The sealed source present within this unit is qualified for exclusion from the facility radiological inventory. Activity of source is in excess of the Category 3 threshold quantity for Cs-137.

Various IWSs cover the following work by operation title: "Confocal Microscopy," "The Role of Kuzbanian in Thymocyte Development," "Organic, Inorganic, and Polymeric Synthetic Chemistry," "Microarray Applications," "Decoding Functional Sequences through Comparative Genomics," "Dosing rodents for metabolite and tissue collection," "DNA Damage and repair," "Metabolism and Mutagenicity of Heterocyclic Amines," "Mouse Genome Mapping and Functional Genomics," "Reproductive and Developmental Molecular Cytogenetics," "Studying the Interaction of Flor-Essence, Tonic and PhIP," "Quantitative analysis of Yersinia pestis ORF38 protein, a potential periplasmic binding protein," "Feeding of a PhIP-containing diet to rats," "Multiplexed Immunoassay Development for Pathogen Detection (APDS)," "Laboratory Animal Anesthesia Machine," "Animal Care Facility," "Cesium 137 Irradiator Operation," "Isolation and Functional and Structural Analysis of Proteins," and "DNA, RNA and Protein Adduct Studies and BioAMS Sample Preparation."

Did Facility Management receive any notifications of credible external threats from nearby facilities? yes ☐ no ☒

If yes, list the following for each notification:

Source Facility:	Facility Contact(s):	Phone # (s):
N/A	N/A	N/A

Describe Hazard(s):
N/A

Hazard Identification Table

Check the hazard types found in the facility.

Not Found	Found		
☐	☒	Biological Hazards	Complete block I, below
☐	☒	Chemical Hazards	Complete block II, below
☒	☐	Explosive Hazards	Complete block III, below
☐	☒	Radiological Hazards	Complete block IV, below

☒	☐	Industrial Hazards — Complete block V, below

I. Biological Hazards

Check — BioHazard Type

☒ **Non-Select Agents**

Check highest group in facility:

- ☐ RG1 Agents
- ☒ RG2 Agents
- ☐ RG3 Agents

☐ **Select Agents**

Select highest group in facility:

- ☐ RG1 Agents
- ☐ RG2 Agents
- ☐ RG3 Agents

☒ Other BioHazards (e.g., Blood, nucleic acid, lab animals, contaminated needles/sharps, animal/human tissues)

Biological Safety Level (BSL)

Check highest level in facility:

☐ N/A ☐ BSL-1 ☒ BSL-2 ☐ BSL-3

II. Chemical Hazards

Check — ChemHazard Type

- ☒ Flammable, volatile or fuming
- ☒ Toxic materials (acutely toxic, toxic, systemic toxin, toxic gases)
- ☒ Corrosives/irritants
- ☒ Reactive materials (e.g., air/water sensitive; pyrophoric; thermally, shock, or friction sensitive; perchlorate)
- ☒ Carcinogens, mutagens, reproductive hazards
- ☐ Pesticides
- ☐ Beryllium
- ☒ Materials of special concern (e.g., alkali metals, fluorine, asbestos, lead, mercury, PCB)
- ☐ Other regulated metals (e.g., chromium, copper, nickel, zinc)
- ☐ Other:_____

Do any chemicals exceed LSI classification?

☐ YES ☒ NO

For chemicals that exceed LSI classification, attach maximally planned chemical inventory listing.

III. Explosive Hazards

Check

- ☐ Primary High Explosives
- ☐ Secondary High Explosives
- ☐ Propellants/Low Explosives
- ☐ Firearms Ammunition

Do any of the explosive types checked above have any of the following associated hazards?

- ☐ Fragmentation Hazards (Primary Fragments)
- ☐ Group L Explosives

Attach maximally planned inventory listing for each explosive type checked.

IV. Radiological Hazards

Check — Sum of Ratio

- ☒ <1 of RQ thresholds (40 CFR 302.4 Appendix B)
- ☐ >1 of RQ thresholds < Cat. 3 Thresholds (DOE-STD-1027-92, Table A.1)
- ☐ >Cat. 3 Thresholds (DOE-STD-1027-92, Table A.1) < Cat. 2 Thresholds (DOE-STD-1027-92, Table A.1)

Does facility contain the following?

Radiation Generating Devices:

- ☐ Radiation generating devices not covered by DOE O 420.2A (e.g., X-rays, Electron Beams, Radiography Equipment): class IV
- ☐ Radiation generating devices covered by DOE O 420.2A (Accelerators).

Exempted materials:

- ☒ Radioactive Certified Sealed Sources
- ☐ Rad. In Type B Containers with current certificates of compliance
- ☒ Either in quantities>Cat. 3 thresholds (DOE-STD-1027-92, Table A.1)

Attach listing of maximally planned radiological materials inventory.

V. Industrial Hazards

Check if hazard present	Industrial Hazard	Examples of industrial hazard(s) for each general category. (Select Industrial Hazards found.)	List industrial hazard(s) that could directly impact the public (fence-line) or colocated worker (100 m).
☒	Electrical	☐ Battery banks, ☐ Cable runs, ☐ Diesel generators, ☒ Electrical equipment, ☒ Heaters, ☒ High voltage (> 600V), ☒ Motors, ☒ Power tools, ☒ Pumps, ☒ Service outlets, ☐ Fittings, ☒ Switchgear, ☒ Transformers, ☐ Capacitors, ☐ Magnetic fields, ☐ Transmission lines, ☒ Wiring/underground wiring, ☐ Other:_____.	None present
☒	Thermal	☐ Boilers, ☒ Bunsen burner/hot plates, ☒ Electrical equipment, ☒ Electrical wiring, ☐ Engine exhaust, ☐ Furnaces, ☒ Heaters, ☒ Lasers, ☒ Steam lines, ☐ Welding surfaces, ☐ Welding torch, ☒ other:_____	None present
☒	Kinetic	☐ Acceleration/deceleration, ☒ Bearings, ☐ Belts, ☒ Carts/dollies, ☒ Centrifuges, ☐ Crane loads (in motion), ☐ Drills, ☒ Fans, ☐ Firearm Discharge, ☐ Fork lifts, ☐ Gears, ☐ Grinders, ☒ Motors, ☐ Power tools, ☐ Presses/shears, ☐ Saws, ☐ Vehicles, ☐ Airplane, ☐ Vibration, ☒ Other: Robots	None present
☒	Potential (pressure)	☒ Autoclaves, ☒ Boilers, ☐ Coiled springs, ☐ Furnaces, ☒ Gas bottles, ☐ Gas receivers, ☒ Pressure vessels, ☒ Vacuum vessels, ☒ Pressurized system (e.g., air), ☒ Steam header and lines, ☐ Stressed members, ☐ Other:_____	None present
☒	Potential (height/mass)	☐ Cranes/hoists, ☐ Elevated doors, ☐ Elevated work surfaces, ☐ Elevators, ☐ Lifts, ☒ Loading docks, ☐ Mezzanines, ☐ Floor pits, ☒ Scaffolds and ladders, ☒ Stacked material, ☒ Stairs, ☐ Other:_____	None present
☒	Internal Flooding Sources	☒ Domestic water, ☒ Fire suppression piping, ☒ Process water, ☐ Other: _____	None present

Hazard Classification

Select the appropriate hazard level from the dropdown menu:	
Biological	**LSI**
Chemical	**LSI**
Explosive	**Not found**
Radiological materials	**Low**
Radiation generators	**Not found**
Industrial	**LSI**

Controls for LSI classified facilities: (Low, Moderate and High hazard controls are addressed in Tier 2 or Tier 3 SBDs.)

Briefly describe controls developed to assure that facility operations do not exceed the hazard classification:

1. Biological research activities are limited to those that can be performed in BSL-2 laboritories.
2. Chemical inventories are controlled to the lesser of the TEEL-based ("Q") values Q0 (at 600 meters) or Q1 (at 100 meters).
3. No explosive materials shall be brought into the facility without formal analysis and documentation.
4. The total facility inventory (other than the excluded inventory) will be maintained less than the RQ limits in Appendix B of 40CFR 302.4, on a cumulative sum-of-the-ratios basis for all isotopes. This basis excludes certified sealed sources, but includes any source for which certification is no longer current.

Other controls?
Briefly describe:

Work involving recombinant DNA or infectious agents (or their components) shall be submitted to the Institutional Biosafety Committee (IBC) for approval and/or registration.

List what document(s) through which the controls will be implemented:
Facility Safety Plan, IWSs and IWS/SPs.

Radiological Evaluation Table B-364

The maximally planned inventory of radiological materials below is not an inventory limit per se, but instead reflects the maximum anticipated at the time of document preparation. The total allowable radioactive material inventory for LSI classification of B364 is controlled by the Reportable Quantity values in 40CFR 302.4, Appendix B on a cumulative sum-of-the-ratio basis for all isotopes. Therefore, greater quantities of the isotopes below may occasionally be present and additional isotopes may also be introduced in the future as long as the LSI classification for radiological materials is maintained.

The entire year's operational use quantity of radioisotopes is listed in the table below, with no current inventory. This was done in order to determine a ratio to Reportable Quantities (RQ) of these radionuclides: The Annual Use Quantity listed below refers to the entire year's operational inventory of radioisotopes.

Table 1 Radiological Inventory B-364

Radionuclide	12/07/05 Inventory (Ci)	Annual Use Quantity (Ci)	Proposed Maximum Quantity (Ci)	40CFR302.4 Appendix B RQ (Ci)	Ratio of Inventory to RQs	Ratio of Inventory Proposed Maximum Quantity to RQs
C-14	None	5.0E-3	5.0E-02	***1.0E+01***	0	5.0E-3
Tritium	None	1.0E-5	5.0E-01	***1.0E+02***	0	5.0E-3
P-32				***1.0E-01***		
				Sum of Ratios	***0***	***1.0E-2***

Table 2 Excluded Radiological Inventory B-364

Location	Description	I.D. Number	Nuclide	Original Activity [dpm/Bq/Ci]	Units	Reference Date	Mass [g]	Specific Activity [Ci/g]	Halflife [years]	Decay Corrected Activity [Ci]	Final RQ [Ci]	RQ Fraction	Cat III Threshold [Ci]	Cat III Fraction	Excluded yes/no
Room 1523	Sealed Source Irradiator	401135 DOE #3690015	**Cs-137**	5.0E+03	Ci	3/16/05	34.48	8.70E+01	3.00E+01	3.00E+03	1	3.00E+03	6.0E+01	5.0E+01	yes

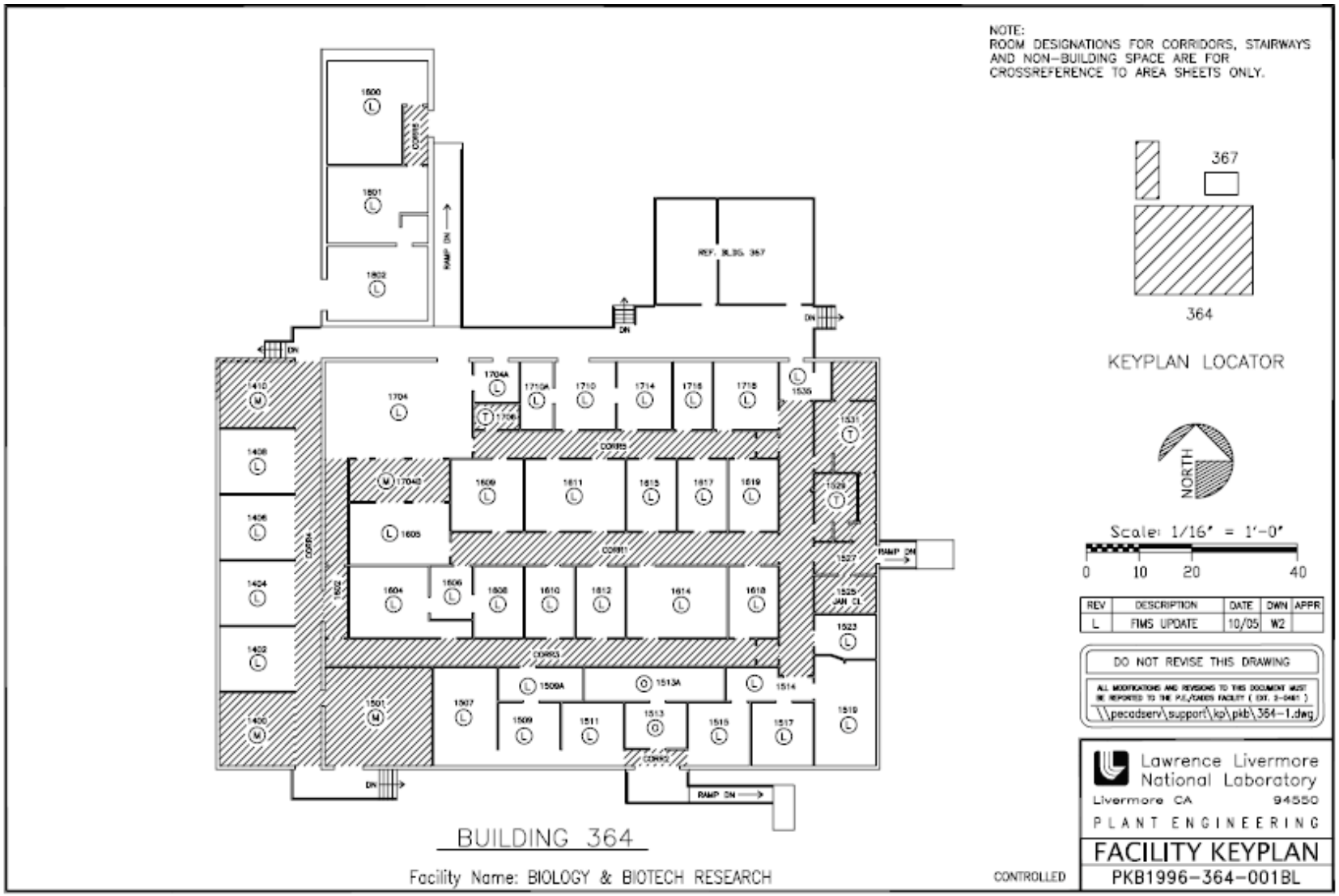
Description	RQ Fraction	Cat III Fraction	Cat II Fraction
Annual Facility Inventory Summation	5.0E-04	N/A	N/A
Excluded Inventory Summation	3.00E+03	5.0E+01	3.37E-02

Proposed Maximum Quantity listed above reflects anticipated values, not limits. Refer to Chapter 1, Hazard Classification section of this document for radiological inventory limits.

Note: Source number 401135 was purchased from JL Shephard & Associates on November, 21 of 1983 as Nuclear Source No. S.N. 83-CS-10 (source container description – DOT Type 7A - Model MK 1 JL Shephard Irradiator), containing 34.48 g Cs-137. Source capsule designation JLS 6810 meets DOT Special Form testing criteria. Per DOE STD-1027-92 CN1 this source may be excluded from a summation of the radioactive source inventory for facility categorization purposes.

Per LLNL ES&H Manual 3.1, Non-Nuclear Safety Basis Program, if sealed source or Type B container exclusions are used and the excluded inventory is greater than nuclear Category 3 threshold quantities, the facility shall be classified as Low Hazard.

Figure 1: Building Layout



2.0 Hazard Analysis

This chapter documents a brief hazards analysis, consistent with provisions of ES&H Manual Document 3.1, *Nonnuclear Safety Basis Program*, for hazards classified above the LSI level. In chapter 1.0 of this document, one hazard was classified as Low: (1) Radiological Materials.

2.1 Radiological Materials

The excluded facility inventory summation exceeds the DOE-STD-1027-92 Category 3 nuclear facility thresholds. Per ES&H Manual Document 3.1, this requires hazards analysis and a classification of Low Hazard.

No radioactive materials are excluded from the facility inventory summation based upon storage in DOT Type B shipping containers.

2.1.1 Controls

The following initial conditions are assumed in assessing radiological material hazards:

1. Consistent with the provisions of ES&H Document 3.1, all certified sealed sources excluded from the facility inventory summation will meet the exclusion requirements specified in DOE-STD-1027-92. As such, all certified sealed sources will have been properly maintained per LLNL ES&H manual which complies with DOE sealed source policy.

Initial condition 1 is necessary to ensure excluded sealed sources maintain their certification with regards to factors such as leak tightness. From this initial condition, two credited controls have been designated in the form of Operational Safety Requirements administrative controls (OSR ACs). One credited control covers eligibility for exclusion from the facility inventory. The other credited control covers maintenance of eligibility for exclusion.

For all other hazards, initial conditions that result in credited controls are indicated by bold-face italics in the hazard tables found in section 2.1.3.

2.1.2 Postulated Hazardous Events

One general event is identified in the hazards analysis – radioactive release as the result of physical stresses imposed on:

1. Certified sealed source above Category 3 limits

2.1.2.1 Certified sealed sources exceeding Category 3 limits

There is one certified sealed source exceeding 1027-92 Category 3 limits:

1. A 3,000 curie Cs-137 source (Cs-137 Cat 3 Limit is 60.0 curies) stored and used in B-364, Room 1523 [Materials Management source number 401135]

This Cs-137 source was purchased from JL Shephard & Associates on November, 21 of 1983 as Nuclear Source No. S.N. 83-CS-10 (source container description – DOT Type 7A - Model MK 1 JL Shephard Irradiator), containing 34.48 gm Cs-137. Source capsule designation JLS 6810 meets DOT Special Form testing criteria. Documentation that source packaging S.N. 83-CS-10 contained in the MK-1 irradiator has been tested and passed the tests specified by DOT is maintained by the facility, and is also available directly from Materials Management. In addition, this source has been properly maintained per LLNL ES&H Manual Document 3.1, section 3.4.2 which complies with DOE sealed source policy. Per DOE STD-1027-92 CN1 this source may be excluded from a summation of the radioactive source inventory for facility categorization purposes.
Scenarios regarding radiological release challenging CAT 3 limits are not credible.

1. Source #401135 is stored and is used in the above described JL Shephard MK 1 irradiator located in Room 1523.
2. Source #401135 is integral to the MK 1 irradiator and remains within the irradiator body at all times. When inactive, the source is stored in a lead-shielded cavity at the base of the irradiator. While in use, the source is raised into the lead-shielded sample cavity.
3. Source #401135 is used in room 1523 to irradiate small items.
4. Capsule (S.N. 83-CS-10) containing source #401135 was designed and validated as meeting the requirements for "special form radioactive material," as defined in 49 CFR 173.469(b)-(1)-(4) and complies with the U.S.N.R.C's Registry of Sealed Sources and Devices Registry under Sheet No. CA0598S119S. As such, the container will have met special form container testing criteria for free drop, percussion, heating and immersion tests demonstrated through prototype specimen capsule testing.

49 CFR 173.469 Special Form Package Testing Criteria:

a. Impact Test.

The specimen must fall onto the target from a height of 9 m (30 feet) or greater. The target must be as specified in (49 CFR) Sec. 173.465(c)(5).

b. Percussion Test.

i. The specimen must be placed on a sheet of lead that is supported by a smooth solid surface, and struck by the flat face of a steel billet so as to produce an impact equivalent to that resulting from a free drop of 1.4 kg (3 pounds) through 1 m (3.3 feet).
ii. The flat face of the billet must be 2.5 cm (1 inch) in diameter with the edges rounded off to a radius of 3 mm ±0.3 mm (0.12 inch ±0.012 inch).
iii. The lead must be of hardness number 3.5 to 4.5 on the Vickers scale and thickness 2.5 cm (1 inch) or greater, and must cover an area greater than that covered by the specimen.
iv. A fresh surface of lead must be used for each impact.
v. The billet must strike the specimen so as to cause maximum damage.

c. Bending test.

i. This test applies only to long, slender sources with a length of 10 cm (4 inches) or greater and a length to width ratio of 10 or greater.
ii. The specimen must be rigidly clamped in a horizontal position so that one half of its length protrudes from the face of the clamp.
iii. The orientation of the specimen must be such that the specimen will suffer maximum damage when its free end is struck by the flat face of a steel billet.
iv. The billet must strike the specimen so as to produce an impact equivalent to that resulting from a free vertical drop of 1.4 kg (3 pounds) through 1 m (3.3 feet).
v. The flat face of the billet must be 2.5 cm (1 inch) in diameter with the edges rounded off to a radius of 3 mm ±0.3 mm (.12 inch ±0.012 inch).

d. Heat test.

The specimen must be heated in air to a temperature of not less than 800 °C (1475 °F), held at that temperature for a period of 10 minutes, and then allowed to cool.

e. Immersion test (for encapsulated material)

i. The specimen shall be immersed in water at ambient temperature. The water shall have an initial pH of 6-8 and a maximum conductivity of 1 mS/m (10 micromho/cm) at 20 °C (68 °F).
ii. The water and specimen must be heated to a temperature of 50 °C ±5 °C (122 °F ±9 °F) and maintained at this temperature for four hours.
iii. The activity of the water must then be determined.
iv. The specimen shall then be kept for at least seven days in still air at not less than 30 °C (86 °F) and relative humidity not less than 90%.

The DOT Type 7A - Model MK 1 JL Shephard Irradiator has also met the following testing critera:

a. **Water spray Test** - Prototype specimen was subjected to a water spray test, where the entire surface was wetted for 30 minute. Water spray did not damage the package and there was no loss of package integrity.

b. **Free Drop Test** - The free drop test was performed on the package within two hours of the water spray test in conformance with 1975, 1992 & 1998 test requirements from a minimum height of 4 ft (1.2 m). There was no loss of containment of the radioactive material. After the test was performed, each capsule was examined visually and subjected to a leakage test.

c. **Penetration Test** - A 1.25" or 3.2 cm diameter steel bar, weighing 6 kg or 13.2 lbs. with a hemispherical end was dropped vertically onto the top, sides and shipping fixture and the surface of the package was not broached.

d. **Compression Test –** A weight (either 5 times the weight of the package or 266lbs/sq. ft x vertical area of the package) is distributed over the top of the package (evenly distributed to two opposite sides of the package, one must be the base) for a minimum of 24 hours. There was no visible damage and the package did not compress.

e. **Vibration Test –** The original package did not have a vibration test performed on it and the 1982 regulations did not require this test. This test is currently required by the 1998 regulations for new packages. This package and JLS&A packages of similar design survived thousands of shipments over the last 30+ years with no damage to the integrity of the package or release of the radioactive material due to vibration resonance or acceleration encountered in real (not simulated) transportation conditions.

5. Combustible loading in Building 364 is moderate.
6. Facility seismic design generally correlates to Seismic Performance Category 1 (PC-1), which is consistent with an office building in its structural resistance to seismic inputs, and spread of fire.
7. Normal storage in Room 1523 is limited to paperwork and instrumentation necessary for the operation of the irradiator and is secure from major impact, even in the event of building failure.
8. The building is of concrete block exterior walls. The main portion of the building has a built-up roof on a steel deck over steel joists and columns with lightweight concrete insulation. The interior walls are gypsum board over wood studs. The 1800 (North) wing is also constructed with concrete block exterior walls and has a built-up roof on ½" plywood roof sheathing over open-web wood bar joist roof trusses. I-beams and other structural members are positioned such that they are unlikely to yield direct impact or crushing stresses on the source contained within irradiator housing.

2.1.3 Hazards Analysis Tables

Event RM- 1: Radioactive release as the result of physical stresses imposed on certified sealed source Number 401135

Causes:	1. Facility initiated fire 2. Natural Phenomena – seismic or wind events results in the direct or indirect application of mechanical or thermal energy 3. External Events – vehicle accident results in the direct or indirect application of mechanical or thermal energy
Preventive Features	***Design:*** - Special Form source container provides robust resistance to physical stresses & satisfies the test requirements of 49 CFR 173.469 - Fire suppression system limits potential for fire growth and propagation **Administrative:** - Source integrity and work area maintained per the provisions of ES&H Manual Document 20.2, *Radiological Safety Program for Radiological Materials* - Moderate combustible loading to support fire propagation
Mitigating Features	**Design**: - Source stored in designated secure location. **Administrative**: - Facility and institutional emergency response plans.
Unmitigated consequences:	***Consequence Category D*** – No release of material for postulated event / causes.
Probability:	Marginal for significant impact to a source with an associated consequence ranking of Consequence Category D
Comments:	Accident analysis is not required.

3.0 Controls

This chapter formally specifies the credited controls and associated Operational Safety Requirements for Building 364. These controls are limited to initial conditions specified in the hazard analysis.

3.1 Radiological Materials

One item is designated as credited controls:

1. Consistent with the provisions of ES&H Document 3.1 & DOE-STD-1027-92, the facility will retain documentation for each certified sealed source excluded from the inventory showing that the source, or prototypes of the source, have been tested and passed the tests specified by DOT or ANSI. Such sources will also be subject to the LLNL Radiological Safety Program for Radioactive Materials maintenance requirements for radioactive sealed sources. Should a radioactive source fail periodic leak checks, it shall be removed from service.

This control precludes the potential for radiological material storage and handling at Building 364 from presenting a significant risk to personnel outside the immediate operational area. It requires definition as an OSR ACs.

3.2 OSRs

The controls cited in Section 3.1 are implemented in the Building 364 OSRs, as two general ACs for excluded radioactive material documentation and maintenance, and inventory control. Additionally, per ES&H Manual Document 3.1, four general ACs are specified for deviations from OSRs, training, procedures, and emergency planning.

No Minimum Functional Requirements or associated Testing Requirements are defined.

3.3 Impacts on Nearby Facilities

Building 364 operations do not represent a significant risk to adjacent facilities or the public.

4.0 OSRs

This chapter formally defines the OSRs identified in section 3.2.

4.1 Specific Administrative Controls

No specific ACs have been defined.

4.2 General Administrative Controls

Six general ACs are defined.

4.2.1 Excluded Radioactive Material Documentation & Maintenance

a. The facility will retain documentation for certified sealed source #401135, which has been excluded from the inventory, showing that the source or prototypes of the source, have been tested and passed the Special Form tests specified by DOT in 49 CFR 173.469 or ANSI N43.6 "Sealed Radioactive Sources, Categorization."

b. Certified sealed source #401135 will also be subject to the LLNL Radiological Safety Program for Radioactive Materials maintenance requirements for radioactive sealed sources. This includes periodic inventories and leak checks. Should it fail periodic leak checks, it shall be removed from service and handled in accordance with the facility source control policy.

4.2.2 Inventory Control Program

Additions to the excluded radioactive material inventory require application of the change control process to ensure that no additional accident analysis is required per the provisions of ES&H Manual Procedure 3.1. Such documentation must be approved by the Authorization Basis signature authority.

4.2.3 Deviations from OSRs

The OSRs define the controls needed to ensure that the facility/operation remains within the safety basis established. They shall be formally controlled with all changes requiring approval at the same level as the associated safety basis document.

A.1 Compliance
The Facility Manager is responsible for ensuring that the OSR requirements are met. Compliance is demonstrated by establishing, implementing, and maintaining the ACs identified in this document.
A.2 Violation
Violation of an OSR occurs as a result of failure to comply with an AC statement. Failure to comply with a specific AC constitutes an OSR violation. For general

ACs, violation occurs when the failure is of sufficient magnitude that the overall intent of the referenced program is not fulfilled.

A.3 Response to Violations

If an Administrative Control is violated, proceed as follows:

1. Place the facility in a safe condition, and notify the safety basis signature authority.

2. Prepare an Occurrence Report.

3. Prepare a recovery plan, if appropriate, describing the steps leading to compliance with the Administrative Control.

4. Perform and document a technical evaluation, if appropriate, of the Administrative Control violation to determine if any damage occurred.

A.4 Emergency Actions

Emergency actions may be taken that depart from a requirement in the OSR provided that:

- An emergency situation exists;
- These actions are needed immediately to protect health and safety; and
- No action consistent with the OSR can provide adequate or equivalent protection.

Such emergency actions shall be performed by personnel trained and qualified for the necessary equipment or systems. If an emergency action is taken, the safety basis signature authority should be notified as soon as is practically possible.

4.2.4 Training

Facility-specific training requirements shall be identified and implemented consistent with the appropriate provisions of *ES&H Manual 3.1* for hazards that result in a facility being classified as low hazard or higher. Specifically, workers responsible for generating, maintaining, and ensuring compliance this document shall obtain a facility-specific working-level awareness of the contents and controls of the facility safety basis and the process of document implementation, (e.g., through required reading, on-the-job training, or briefing). The training should include a review of the following:

- Classification level of each facility.
- The type of SBD associated with each facility and where to obtain a copy.
- Roles, responsibilities, and authority for maintaining and implementing the safety basis.
- Safety basis controls and the associated QA requirements needed to maintain them.

- The control implementation documents (e.g., FSP, SP, SOPs).
- Reporting requirements.
- Change control process.
- Configuration management as relevant to maintaining facility safety systems to ensure risk reduction and segmentation requirements
- What to do in case of a control nonconformance.

4.2.5 Procedures

The safety basis document assumptions and controls shall be implemented through facility- and activity-level documents for hazards that result in a facility being classified as low hazard or higher. These assumptions and controls shall flow down from this document to facility implementation documents such as FSPs, SPs, IWSs or facility and/or equipment operating procedures and ES&H programs.

4.2.6 Emergency Planning

An emergency preparedness capability shall be established, implemented, and maintained for hazards that result in a facility being classified as low hazard or higher. It should address the following subjects:

- Notification capability to support localized evacuations.
- Specification of knowledgeable individuals for area/room operations.
- Establishment of assembly points.
- Identification of special actions, if any, that need to be taken in the event of an abnormal situation, including those assessed in this document.

Note that knowledgeable individuals are not required to be continuously available. The intent is to demonstrate a baseline understanding of facility hazards.
The institutional emergency preparedness capability and organization is detailed in UCRL-MA-113311, *Lawrence Livermore National Laboratory EMERGENCY PLAN*. Facility-specific elements of emergency preparedness are contained in the Emergency Response Plan and Procedures section of the Facility Safety Plan.

4.3 Design Features

No building design features have been designated.

APPENDIX A. REFERENCES

1. LLNL *Environment, Safety, and Health Manual*, Document 3.1*, Safety Analysis Program*, UCRL-MA-133867, Revision 1, Lawrence Livermore National Laboratory
2. LLNL *Environment, Safety, and Health Manual*, Document 20.2*, LLNL Radiological Safety Program for Radioactive Materials*, UCRL-MA-133867, Revision 1, Lawrence Livermore National Laboratory
3. LLNL *Facility Hazard Screening Procedure*, AB/NN-101, Revision 1, Lawrence Livermore National Laboratory
4. LLNL Facility Safety Plan, Building 360, Building 360 Complex (August 2002), Lawrence Livermore National Laboratory
5. LLNL *Facility Screening Report for Building 364*,B364 Tier 2 Safety Basis Document, Rev. 0 (December 12, 2005), Lawrence Livermore National .Laboratory
6. DOE Standard, *Hazard Categorization and Accident Analysis Techniques for Compliance with DOE Order 5840.23, Nuclear Safety Analysis Reports,* DOE-STD-1027-92, CN-1.
7. Special Form Certification, *J.L. Shepherd and Associated Model 6810, Cesium-137 source capsule*, August 1, 2001